NUCLEAR, BIOLOGICAL, AND CHEMICAL RECONNAISSANCE SYSTEM (NBCRS), M93A1

Army ACAT III Program

Total Number of Systems:	88
Total Program Cost (TY$):	$219M
Average Unit Cost (TY$):	$2M
Full-rate production (Block I):	1QFY99

Prime Contractor

General Dynamics Land Systems
Henschel Wehrtechnik (Germany)

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The M93A1 Nuclear, Biological, and Chemical Reconnaissance System (NBCRS) is intended to improve the survivability and mobility of Army ground forces by providing increased situational awareness and ***information superiority*** to supported headquarters and combat maneuver elements. With the ability to provide rapid and accurate chemical and radiological contamination information to these elements, the NBCRS vehicle forms a key portion of the ***full-dimensional protection*** concept.

The mission of the lightly armored, wheeled NBCRS is to detect, identify, mark, collect samples, and report chemical and radiological contamination on the battlefield. The three-man NBCRS crew accomplishes these missions by using a sophisticated suite of nuclear and chemical alarms and detectors integrated within the vehicle chassis. The on-board M21 Remote Sensing Chemical Agent Alarm allows the crew to detect chemical agent clouds from as far as 5 kilometers away. The crew can perform chemical and radiological reconnaissance operations while operating in a shirtsleeve environment inside the NBCRS vehicle, even while the vehicle is operating in a contaminated area.

BACKGROUND INFORMATION

Based on the perceived need to quickly field a chemical reconnaissance vehicle to U.S. forces in Europe in the late 1980s, the NBCRS Non-Developmental Item program was structured into three acquisition phases: (1) Interim System Production, which provided 48 urgently needed German-produced

vehicles (designated the M93) that met many of the American requirements. As part of this phase, the German government donated an additional 60 Americanized German M93 vehicles to the U.S. government in support of Operation Desert Storm; (2) System Improvement Phase, which provided vehicles (designated the M93A1) that satisfied all American Requirements of Operational Capability; and (3) Block 1 modification, to upgrade many of the M93 vehicles to the M93A1 configuration.

A precursor to the M93A1 NBCRS underwent IOT&E from March-May 1994 at Ft. Bliss, TX. DOT&E determined that, combined with chemical warfare agent test results from Dugway Proving Ground, UT, the test was adequate, but the vehicle was neither operationally effective nor operationally suitable. That assessment was based on the system demonstrating chemical warfare agent detection capabilities well below the requirement, the need for excessive maintenance, and low reliability. Crew performance indicated inadequate training and/or overly complex tasks.

After integrating some improvements into the IOT&E vehicle, the Army type-classified the vehicle in June 1995 as the M93A1. The Director approved the NBCRS TEMP in December 1996. This TEMP included plans for an operationally focused Limited User Test (LUT) to be conducted as a part of the vehicle's Production Verification Testing.

TEST & EVALUATION ACTIVITY

The Test and Experimentation Command conducted the LUT in May 1998 at Yuma Proving Ground, AZ. It consisted of two M93A1 Block 1 configured NBCRS vehicles, each completing two 96-hour scenarios at wartime operational tempo. They performed route and zone/area reconnaissance operations.

No additional testing was completed on the NBCRS vehicle during FY99.

TEST & EVALUATION ASSESSMENT

Although the Director determined that the operationally focused NBCRS Limited User Test was marginally adequate, results provided enough information to assess the system as operationally effective, operationally suitable, and survivable. The capability of the vehicle and its instrumentation suite to detect and identify chemical warfare agents did not meet stated Army requirements, but compare favorably with currently fielded alternative methods. The NBCRS must identify and quantify each known type of chemical agent and provide a 92 percent or greater probability of detection for these agents. Additionally, a criterion is that, when the NBCRS system reports a contaminated area, there will be a 92 percent or greater probability that the area is contaminated. The Army demonstrated through technical testing and analysis that the inherent capability of the NBCRS to detect and identify actual chemical warfare agents is at least 90 percent. However, during the LUT, the crew was able to detect and identify a simulant challenge 87 percent of the time. Hence, based on both technical tests and limited user test data, the overall demonstrated operational probability of the system and the detecting and identifying chemical warfare agents is at least 78 percent, but no better than 87 percent. Although both the Required Operational Capabilities document and Critical Operational Issues and Criteria specify that the NBCRS must "quantify" chemical agents, the system cannot currently do this.

In general, the vehicle's crew could successfully mark contaminated routes, but experienced difficulty in performing the more difficult zone/area reconnaissance missions. The crews were able to obtain samples while operating within contaminated areas, but the device used for holding these samples

needs better human engineering to ensure that the crew can properly use it. Better crew training and crew adherence to doctrinally prescribed procedures may partially ameliorate these deficiencies.

The crews experienced no problems in reporting within required time intervals the results of their reconnaissance missions. However, the process by which the report is received and acknowledged by the unit's Tactical Operations Center adds considerable lag time to the reporting cycle. This delay negatively impacts the timeliness of the vehicle-provided information to the supported units.

Overall system reliability fell just short of requirements. Vehicle maintainability was good, but the vehicle's operational availability fell slightly below stated requirements. Vehicle availability may increase as maintenance personnel become more familiar with the system.

The Army is currently discussing developing Block 2 version of the NBCRS. If developed, this vehicle may be equipped with an enhanced Chemical/Biological Mass Spectrometer, which is intended to provide both chemical and biological warfare agent detection and identification capability. The Director will review and approve both the TEMP and test plans for the operational testing of any follow-on NBCRS vehicle.

CONCLUSIONS, RECOMMENDATIONS, LESSONS LEARNED

The NBCRS Limited User Test demonstrated the need for the system vehicles under test to operate as part of a functioning tactical unit, including the presence of good unit leadership. Several times during the test, the vehicles reported chemical reconnaissance results that, upon reflection, were either clearly inaccurate or insufficient to meet a supported units requirements. A functioning unit command and control element would have provided the crews a more realistic environment for real-time feedback on the sufficiency of their performance.

It is important that the test unit uses either school-approved doctrine or the unit's own Standard Operating Procedures (SOP) during the test, and that any differences between these doctrine, SOP, and test peculiar procedures are understood and documented before the test is conducted. During the NBCRS Limited User Test, the unit's SOP conflicted with school-approved doctrine. Since the test was constructed based on this doctrine, the unit's non-compliance affected the results of the test. Due to the short length of the test and the absence of NBCRS unit leadership, the test director had little time or influence to modify unit operating procedures.